Name: Date:

Exam: Function Reflections (Solution version 10)

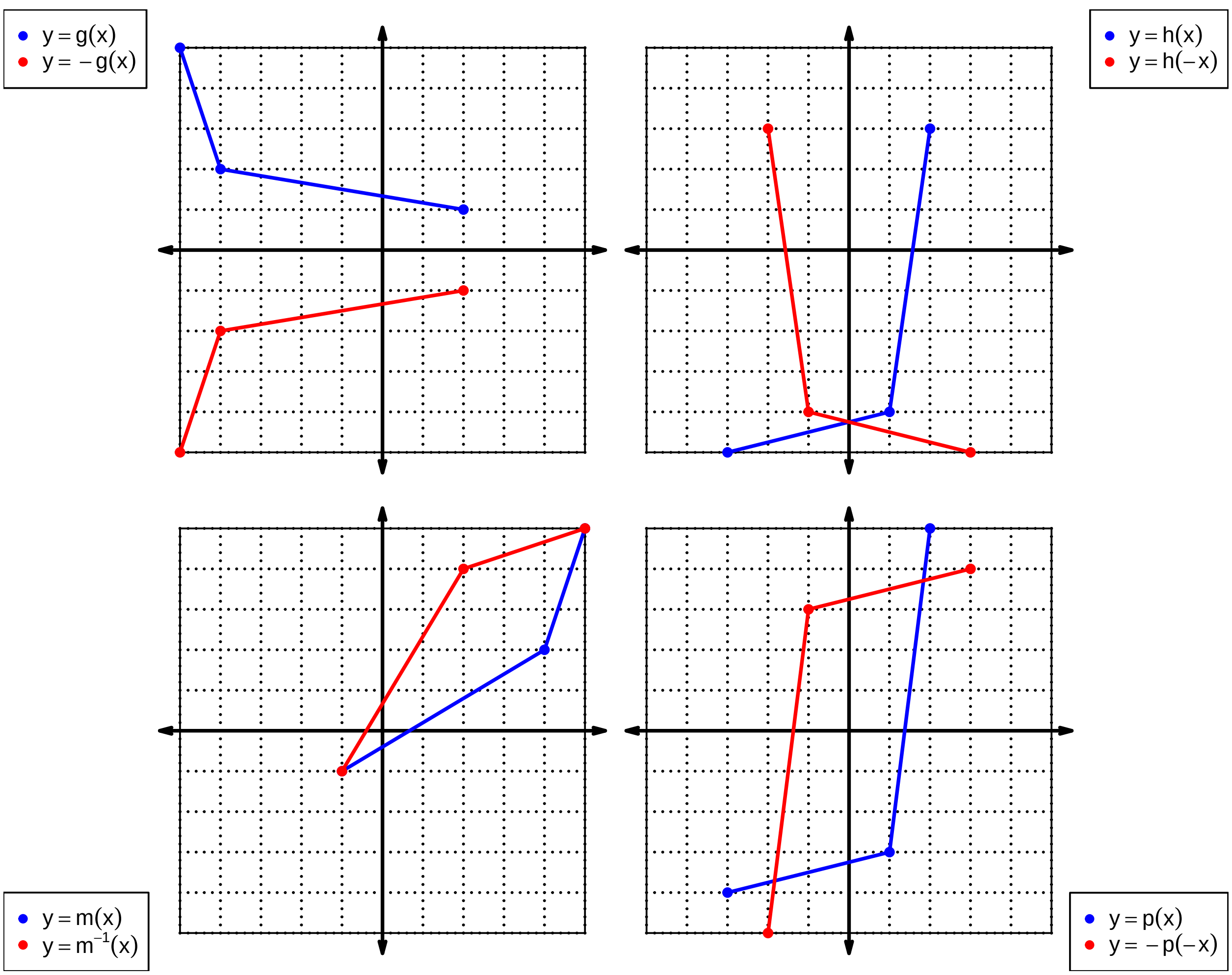
1. Let function f be defined by the polynomial below:

$$f(x) \ = \ -2x^4 - 3x^3 + 5x^2 - 4x + 7$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$-f(x)$	$2x^4 - 3x^3 - 5x^2 - 4x - 7$
$-f(-x)$	$2x^4 + 3x^3 - 5x^2 + 4x - 7$
$f(-x)$	$-2x^4 + 3x^3 + 5x^2 + 4x + 7$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	2	4	8
2	4	3	6
3	7	1	5
4	9	7	9
5	5	8	2
6	8	6	4
7	6	5	1
8	3	9	3
9	1	2	7

3. Evaluate $h(1)$.

$$h(1) = 8$$

4. Evaluate $g^{-1}(2)$.

$$g^{-1}(2) = 9$$

5. By filling more rows of the table, it is possible to make function f **even**. If that were done, what would be the value of $f(-7)$?

If function f is even, then

$$f(-7) = 6$$

6. By filling more rows of the table, it is possible to make function g **odd**. If that were done, what would be the value of $g(-5)$?

If function g is odd, then

$$g(-5) = -8$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

   $$p(x) \ = \ -x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

   $$\begin{aligned} p(-x) \ &= \ -(-x)^3 + (-x) \\ p(-x) \ &= \ x^3 - x \end{aligned}$$

   b. Express $-p(-x)$ as a polynomial in standard form.

   $$\begin{aligned} -p(-x) \ &= \ -\left(x^3 - x\right) \\ -p(-x) \ &= \ -x^3 + x \end{aligned}$$

   c. Is polynomial p even, odd, or neither?

   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

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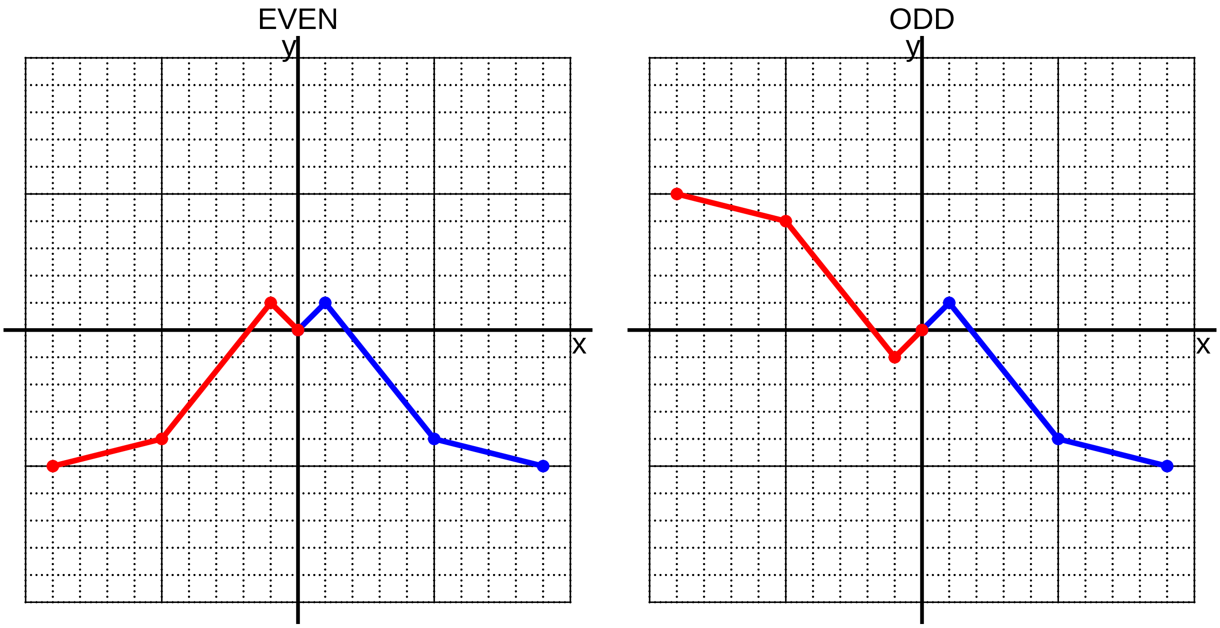
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x-4}{5}$$

a. Evaluate $f(59)$.

step 1: subtract 4
step 2: divide by 5

$$f(59) = \frac{(59)-4}{5}$$
$$f(59) = 11$$

b. Evaluate $f^{-1}(10)$.

step 1: multiply by 5
step 2: add 4

$$f^{-1}(x) = 5x+4$$
$$f^{-1}(10) = 5(10)+4$$
$$f^{-1}(10) = 54$$

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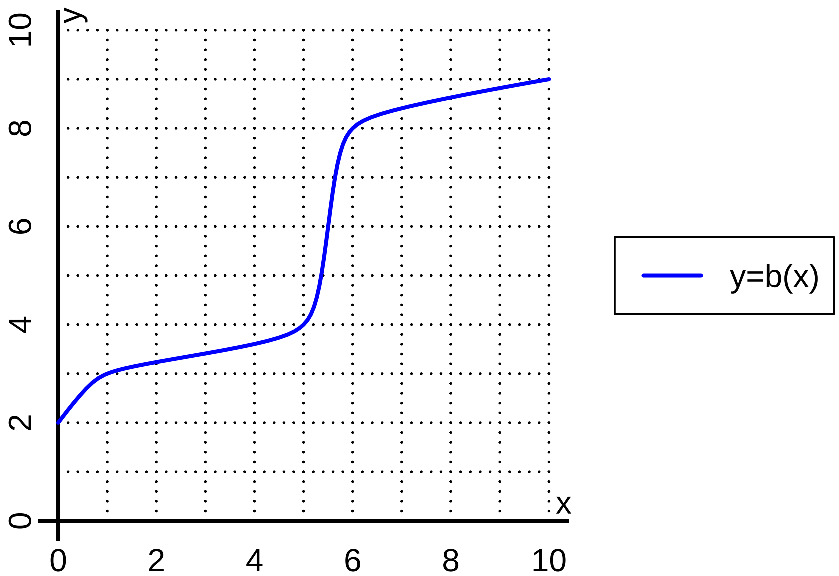
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(5)$.

$$b(5) \ = \ 4$$

b. Evaluate $b^{-1}(3)$.

$$b^{-1}(3) \ = \ 1$$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	5	-5	5	-5
-1	-8	8	-8	8
0	0	0	0	0
1	-8	8	-8	8
2	5	-5	5	-5

b. Is function f even, odd, or neither?

even

c. How do you know the answer to part b?

Function f is even because column $f(-x)$ matches column $f(x)$ exactly.